

Summary of the Marbled Murrelet Nesting Meeting,  
February 8, 1999

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Diane Evans  
Tim Max

Sherri Miller- via speaker phone  
Kim Nelson  
Ken Ostrom  
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Meeting Overview

We will develop two models, a non-map vegetative model and a spatial or map model. The non-map model should be able to provide better quantitative predictions (ie., habitat amounts), whereas the map model will give spatial information based on remote sensed imagery (but since key characteristics like platforms cannot be obtained through satellite images, we're not sure how successful this product will be). The models are being developed to determine the likelihood that murrelets would be located in a particular area by comparing areas murrelet are known to use versus all available forested areas (use vs available) and areas murrelets use versus absence areas (use vs. nonuse).

For each model we will discuss or define various aspects of the model (see the table below). During this meeting we were able to decide on many of the Map Model Use vs Available aspects.

Map Model

Looking at occupied sites, known nest sites and absence sites. Combining or lumping the occupied and nest sites would create a larger sample size. Could develop separate models- one for occupied and one for nesting and not worry about validation; or could develop a model using occupancy and just use the nest site as a partial validation. The decision to separate each geographic survey area has been deferred due to varying data reasons.

It was suggested to keep the occupancy variable categorical- occupied vs unoccupied. If changed into a continuous variable there are problems associated with quality assurance of the repeatability of observers.

The modeling response will be deferred until Sherri has something to report on her exploratory work along with PhD student Carolyn Meyer, who is checking into the ability to use logistic regression in this way. Will look into this in the next month. Jim notes, we'd have to make sure logistic regression assumptions are not violated.

The Oregon data base may have similar problems as the WDFW data base (can't determine easily whether a site has been surveyed to protocol).

Discussion notes: 400 m radius circle = 50.29 hectares = 124.2 acres. The center of the circle will be geometric mean of the stations. The center is based on stations rather than occupied detection locations, as long as it is a repeatable process. Probably can use GIS to determine if

station locations are available. Diane will look into performing some trial tests on a few sites to develop a cost estimate to perform this task. It may require going back to original field data for each area. Also want to assess how repeatable the process can be. Note shift must be objectively standardized. Time-line a couple of months. Diane will do 15-20, Sherri will do 25-30. Need to record the procedure.

804 pixels in the 400 m radius circle (~125 acres or ~50 ha)  
each pixel is 25meters square (625 square meters)

#### Discussion Points for Murrelet Models

	Map Model		Non-map Model	
Definition	Use vs. Avail.	Use vs. Nonuse	Use vs. Avail.	Use vs. Nonuse
Use	Occupied analyzed separate from known nest sites  Or model built with occupancy and reserve nest sites for a partial validation  Or use number of occupancy and presence detections (total detections or standardized by counts per unit effort.  Or use number of detections at occupied sites.			
Basic Model Form	Logistic regression for occupancy and nest sites  and linear or nonlinear regression for counts			
Clear expectations of what is possible for models	Produce a map that is understandable with an idea of precision			
Independent Variables	Quadratic mean diameter for the dominates and co-dominants  Structure (simple vs.			

	Map Model	Non-map Model	
	<p>complex)</p> <p>% Cover (conifer canopy)</p> <p>Topographic variables (slope, aspect, elevation, distance to ocean, distance to fresh water, distance to nearest similar habitat...)</p>		
Issues of scale	<p>Same scale as protocol (a site: up to 120 acres)</p> <p>400m radius circle centered at the center (geometric mean) of the stations</p> <p>400m radius circle centered at the center of the site (need to get a cost estimate for this)</p> <p>Need to determine how this will be made consistent, objective, and well-defined.</p> <p>Time frame: 2 months.</p>		
Combining scale and independent variables	<p>About 800 pixels per site.</p> <p>Quadratic mean diameter for the dominants and co-dominants: mean % of pixels &gt; some value (50,70)cm Any (1,5,10) pixels with &gt; (50,70)cm Structure (simple vs. complex)</p> <p>% Cover (conifer canopy): Mean Mean % per pixels</p>		

	Map Model	Non-map Model	
	% of pixels > some value (10%,50%,80%)  Topographic variables (slope, aspect, elevation, distance to ocean, distance to fresh water, distance to nearest similar habitat...) means % of pixels with slope < (5,10)% std. dev. of slope  Fragstat statistics: patch size, spatial patterns, etc.		
Reference Population	Temporal: How far back to take Spatial: Split WA&OR from CA		
Variable Selection	All Possible Subsets using AIC with a screening process built-in		
Model Validation			

Next meeting: March 10, 1999, 8:am, Cowlitz Conf. Rm (7<sup>th</sup> floor) Duncan Plaza Bldg., Portland.